PATENT ABSTRACTS OF JAPAN

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(54) CURABLE COMPOSITION

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain the subject composition, improved in hard and brittle properties and weather resistance or the like while retaining the adhesion of an epoxy resin and useful especially as an elastic adhesive by including a specific vinylic monomer having a crosslinkable silvl group and an epoxy resin therein.

SOLUTION: This composition is obtained by mixing (A) a vinylic polymer, having at least one orosalinkable silyl group represented by the formula [Si(R1)2-b(Y)bO]m-Si(R2)3-a(Y)a [R1 and R2 are each a 1-20C alkyl, a 7-20C aryl or the like; Y is OH or the like; (a) is 0, 1, 2 or 3; (b) is 0, 1 or 2; (m) is an integer of 0-19, with the proviso that [(a)+mb]≥1| having preferably <1.8 ratio of the weight-average molecular weight to the number-average molecular weight, especially an acrylic or a methacrylic polymer with (B) an epoxy resin, especially a bisphenol A type epoxy resin at a mixing ratio of the components A/B within the range of (100/1) to (1/100) expressed in terms of weight ratio.

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Claim(s)] CLAIMS

ily) groups shown by (1) general formuls (1), a hardenability constituent which uses a (11) epoxy resin Claim 1]The following two ingredients: A vinyl system polymer which has at least one crosslinkable as an essential ingredient.

- [Si(R1) 2-6(Y) 60] m-Si(R2) 3-a (Y) a (1)

sydrocarbon group of the carbon numbers 1-20, and) three R' baing the same and differing -- **** -Each of R¹ and R² among a formula An alkyl group of the carbon numbers 1-20, An aryl group of the - when the Tori ORGANO siloxy group shown is shown and R1 or two or more R2 exist, they may be parbon numbers 6-20, an analkyl group of the carbon numbers 7-20, or (R) 3SIO - (R is a univalent he same and may differ. When Y shows a hydroxyl group or a hydrolytic basis and two or more Y

exists, they may be the same and may differ, a shows 0, 1, 2, or 3, and b shows 0, 1, or 2, m is an Claim 2](1) The hardenability constituent according to claim 1 whose ratio of weight average nteger of 0-19. However, it shall satisfy that it is a+mb>=1. }

nolecular weight and a number average molecular weight which were measured with gel permeation Claim 3](I) A vinyl system polymer of an ingredient is a hardenability constituent given in any 1 shromatography of a vinyl system polymer of an ingredient is less than 1.8.

nanufacturing method of a vinyl system polymer of an ingredient is a living-radical-polymerization Claim 4](0) It is a hardenability constituent given in any 1 paragraph among claims 1-3, wherein a paragraph among claims 1-2 which are acrylic (meta) polymers.

Claim 5](0) It is a hardenability constituent given in any 1 paragraph among claims 1-4, wherein a

[Claim 6](0) it is a hardenability constituent given in any 1 paragraph among claims 1–5 which have the crosslinkable sily! groups shown by a general formula (1) of an ingrediant in at least one molecular the crosslinkable sily! groups shown by a general formula (1) of an ingrediant in at least one molecular. manufacturing method of a vinyl system polymer of an ingredient is the atomic move RAJIRARU polymerizing method.

the crosslinkable sityl groups which manufactures a vinyl system polymer which has an alkenyl group [Claim 7](0) A process.(1) organic halogenated compound of the following [polymer / which has at least one crosslinkable sily] groups shown by a general formula (1) of an ingredient / vinyl system]. alkenyl group react, and replacing halogen, it is a hardenability constituent given in any 1 paragraph among claims 1-6 which are the polymers obtained by; to which a hydrosilane compound which has Or a vinyl system polymer which has halogen at the end by using a sulfonyl halide compound as an transition metal complex into a catalyst is manufactured, (2) By making a oxy anion which has an nitiator and carrying out the radical polymerization of the vinyl system monomer by making a

two bw alkenyl groups of polymerization nature react is manufactured, it is a hardenability constituent given in any 1 paragolah mong dains 1-6 which are the polymers obtained by changed into a sally group content salestituent by milking a hydrosian compound which has the consistinate Claim 8](0) By polymerizing by a living-radical-polymerization method, a vinyl system polymer which process(1) vinyl system monomers, Manufacture a vinyl system polymer and a vinyl system polymer which has an alkenyl group at the end by making a compound which (2) Continues and has at least has the crosslinkable silyl groups shown by a general formula (1) of an ingredient the following the end, and is shown by (3) general formulas (1) is made to react

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ジーション JP,11-100433,A [CLAIMS]

silyl groups which shows an end alkenyl group by the general formula 1 react.

Claim 10]Elastic adhesives using a hardenability constituent givan in any 1 paragraph among claims Claim 9](II) An epoxy resin of an ingredient is a hardenability constituent given in any 1 paragraph among claims 1-8 which are bisphenol A type epoxy resins.

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recisery. 2.**** shows the word which can not be translated. 3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

Detailed Description of the Invention

[Field of the Invention This invention relates to the hardwarbalky constituent by which refining was the related and with the region policy which has been on crosslinkable slig groups. While staking firmly to various substrates by binding to an epoxy relat in more detail afor the indefining to active the market of the related with a hardwarbalky countituent useful arepoisily as elabor affairware. Description of the Prior ArdEpoxy ramin adhesive is used in this wide range industrial fields, such as Description or a ser, a volket, an influence, subject, and the service of the service or a ser, a volket, an influence in the service or a ser, a volket, an influence in the service or a ser, a volket, and instructing adhesive strength and endurance to wide range mistorials, and as metal, a plantic word. If the service or service, and one or the service in the service or service or metal, a plantic in the service or serv

Up of a themo cover file as building material, an epoxy result — crossificated sibly groups — even if small, and the case to this problem — an epoxy result — crossificated sibly groups — even if small, what is called nodefic alliance system aleastic adhesives that blended the polyether system polymer than the case of the case and widely.

depending to be Schoold by the hardward between the natice of above the the above-mentioned coopy reals and the blood of a golysther system powhere have various problems. First, an encoy reals and be blood of a golysther system powhere have various problems. First, an encoy reals and be objected by experted the sorrest should be good to the disregation that the considerable of the structure is might the above real mention of the compact that the structure of might the above reals mention of the consideration of the material of an experience of the structure of might the above real or the structure of the struct

Wildly ander a bound where a point, Were element expensed in the poorty-bether uffood karylan which was excellent in weathweakily and beinded the crossilivable—ely-ropus content (meta) beinder opporture with inferior compatibility with an epon versilivable—ely-ropus content (meta) proposed polymer with inferiors compatibility with an epon versilivable ely-ropus content (meta) (AP, 2-21/378), However, eince it a caylic polymer used here (meta) is compounded by the free direct polymerization molecular weight distribution is throughered tools in compounded by the free direct polymerization molecular weight distribution is throughered by the direct is an arotherm than it and town with an expory retain will also be hiperviscosity. Since consolitable and grounde among the introduced by a high ratio, there is also, problem that the electric character obtained with much

couche will be applied by the defining a polyetime reportan polytime and weak character, maintaining the logical Theoretier, in this invention, while improving the hard and weak character, maintaining the collection of the properties of the pro

0007]
Means for Solving the Problem]By using a hardenability constituent which uses as an essential margedient a winy system polymar which has at least one crossinkable ailyl groups, and an epoxy

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JP,11-100433,A [DETAILED DESCRIPTION]

resin, it found out that an aforemantioned problem was solved and this invention was reached. [000] [Embodinent of the Invention]The vinyl system polymor of the (1) ingradiant used in this invention

has at least one crosslinkable silvl groups shown with a following general formula (1), $-\left[Si(R^{\dagger}), \frac{1}{2-b}(T), \frac{1}{b}0\right] = -Si(R^{\dagger}) \frac{1}{2-b}(T) = (1)$

[Each 67 H and #F and #F and as a formal man and any group of the action numbers 1-20, 70 to 470, 350 or (67, 350 or (37, 350

[0.09]As a monomer which constitutes the main chain of the vinyl system polymer which has at least one crosslinkable silyl groups of a general formula (1), there are no restrictions in particular and hexyl, acrylic acid (meta) cyclohexyl, (Meta) Acrylic acid-n-heptyl, acrylic acid (meta)-n-octyl, (Meta) trifluoro methylathyl, (Mata) Acrylic acid 2-perfluoro ethylethyl, acrylic acid (mata)-2-parfluoro ethyl-2-perfluoro butylethyl, (Meta) Acrylic acid 2-parfluoro ethyl, acrylic acid (meta) perfluoro methyl. Meta) Acrylic acid series (meta) monomers, such as acrylic acid 2-perfluoro hexadecylethyt, Styrene, Styrene system monomers, such as vinytoluene, alpha-methylstyrene, KURORU styrene, styrene sulfonie acid, and its salt. Perluoro ethylene, Monoalkyl ester and dialkyl ester of silicon content vinyl (meta). Z-methosy ethyl, (Meta) Acrylia sald-3-methosy propyl, acrylia sald (meta). Z-hydroxyethyl.
(Meta) Acrylia sald-2-hydroxyproxyl, asrylia sald (meta) israyli, metaplovidyl saryliae (meta). acrylia sald (meta) z-sarinovatylia sald-2-minovatyli, gamme-(methacrykold oxyproxyl) Umrathoxyalame, tha strlykinovatide addition of aboylia sald orthial Acrylia sald triflutovanethy metryli, an acrylia sald (meta). 2addition of acrylia sald (meta). 2things can be used. If it illustrates, acrylic acid (meta), metryl acrylate (meta), (Meta) Ethyl acrylate, dodecyl, acrylic acid (meta) phenyl, (Meta) Acrylic acid toluyl, acrylic acid (meta) benzyl, acrylic acid sthylmaleimide, propyl maleimide, butylmaleimide, Hexylmaleimide, octylmaleimide, dodecylmaleimide, various kinds of things can be used. Especially as a vinyl system monomer used for manufacture of such as perfluoro propylone and vinylidene fluoride, and vinyltriethoxysilane, maleic acid, and maleic acrylate (meta), (Meta) Acrylic acid-tert-butyl, acrylic acid (meta)-n-pentyl, (Meta) Acrylic acid-nstearyl maleimide, Maleimide system monomers, such as phenylmaleimide and cyclohexylmaleimide: Acrylonitrile, Nitrile group content vinyl system monomers, such as a methacrylonitrile; Acrylamide acrylic acid (meta)-n-propyl, acrylic acid (meta) isopropyl, (Meta) Acrylic acid-n-n-butyl, isobutyl sthylmethyl, (Meta) Acrylic acid 2-perfluoro hexylethyl, acrylic acid (meta) 2-perfluoro decylethyl, system monomer, maleic anhydrides, such as fluoride content vinyl monomer, vinyltrimetoxysilane, Amide group content vinyl system monomers, such as methacrylamide; Vinyl acetate, Conjugated the main chain of the vinyl system polymer of this invention, it is not limited but various kinds of (Meta) Acrylic acid JIPA fluoromethylmethyl, acrylic acid (meta) 2-perfluoro methyl-2-perfluoro soid, Fumano soid, Monoalkyl ester and dialkyl ester of fumano soid, Maleimide, Methylmaleimide, dienes, such as alkenes; butadiene, such as vinyl ester, ethylene, such as vinyl propionate, vinyl pivalate, benzoio acid vinyl, and vinyl cinnamic acid, and propylene, and isoprene; VCM/PVC, a vinylidene chloride, an allyl chlorida, allyl alcohol, etc. are mentioned. These may be used Acrylic scid-2-ethylhexyl, acrylic scid (meta) nonyl, (Meta) Decyl scrylate, acrylic scid (meta) siloxane bond to about 20 pieces.

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JP,11-100433,A [DETAILED DESCRIPTION]

adependently, and even if it carries out copolymerization of the plurality, they are not cared about Acrylic acid (meta) expresses acrylic acid and/, or methacrylic acid with the above-mentioned

a physical-properties side. Although there is no restriction in particular about the molecular weight of [0010]The acrylic (meta) polymer obtained by compounding the crosslinkable sily! groups of a general formula (1) in the above-mentioned monomer with the vinyl system polymer which it has at least one piece, using an acrylic acid aeries (meta) monomer 40% of the weight or more is more preferred from he vinyl system polymer which has at least one crosslinkable silyl groups, it is preferred that it is in revealed that a molecular weight is 500 or less, and handling becomes it difficult that it is 100000 or the range of 500-100000. The original characteristic of a viryl system polymer is it hard to be

by stopping low the viscosity at the time of considering it as a hardenability constituent] It is 1.3 or [0011]There is no restriction in particular about the ratio (Mw/Mm) of the weight average molecular meight (Mw) and the number average molecular weight (Mm) which measured crosslinkable sily) groups piece, i.e., gel permeation chromatography. However, in order essily and to acquire hardened material physical properties sufficient moreover, the molecular weight distribution of narrow one is proferred. eccording to the molecular weight distribution of the vinyl system polymer which it has at least one ess still more prefarably 1.4 or loss still more preferably 1.5 or less still more preferably 1.6 or less

polymer which has a specific functional group containing crosslinkable sityl groups, it can classify into the "control radical polymerization method" which can introduce a specific functional group into "the specific functional group, and the vinyl system monomer is only carried out, and to carry out, and the the man professible, or lease more preferably [as a value of molecular wright distribution, less stem [8 see prefered, and].

[0012] The velop system polymer which has at least one crossificable ship groups can be obtained by which sopheraples greateding, and make the motion in particular in our limited by however, the point of the facilities of a ministrum metable. The worker the point of the facilities of a ministrum metable. The worker is point of the facilities of a ministrum metable. The worker freetty or can be changed into crosslinkable silvi groups at one step or several steps of reactions is obtained. The method of obtaining the vinyl system polymer which has at least one crosslinkable silyl with a high rate of organio-functions-izing. It is necessary to use this monomer quite in large quantities, and there is a problem that the rate of a polymer that this spacific functional group is not system polymer which has a specific functional group which can introduce crosslinkable silyl groups method] usable also in this invantion. However, since the monomer which has a specific functional group in this method is not introduced into a probable polymer, when it is going to obtain a polymer groups is more preferred by changing this specific functional group into crosslinkable silvI groups. general radical polymerization method" to which copolymerization of the monomer which has a polymerization initiator. "A general radical polymerization method" is a simple method, and it is 30013]The radical polymerization method used in the method of compounding the vinyl system polymerization, the problem that only a large polymer with high viscosity is obtained also has position by which the end etc. were controlled using an azo compound, a peroxide, etc. as a introduced becomes large, by use in small quantities convaraely. Since it is a free radical

nethod" the polymer of the molecular weight as a design is obtained mostly, by growing without the chain transfer agent method" the vinyl system polymer which has a functional group at the end is "control radical polymerization method" further, By polymerizing using the chain transfer agent which has a specific functional group. It can classify into the "living-radical-polymerization molecular weight distribution.

ree radical polymerization, the problem that only the polymer whose viscosity it is large and is high is olymerization method", Since a rate of polymerization is high, and the termination reaction by radical functions-izing and it is usable also in this invention, the chain transfer agent which has quite a lot of noluding processing. Like the above-mentioned "general radical polymerization method", since it is a btained also has molecular weight distribution. Unlike thesa polymerizing methods, a "living-radicalobtained, and a polymerization growth end causing a termination reaction etc. [0015]Although the "chain transfer agent method" can obtain a polymer with a high rate of organicspecific functional groups to an initiator is required, and there is a problem on the financial side also crimination reaction does not occur easily and the narrow polymer (Mw/Mn is 1.1 to about 1.5) of coupling etc. occura easily, though it is a radical polymerization made difficult [control], While a

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molecular weight distribution is obtained, a molecular weight is freely controllable by the preparation which an end always continues having activity and the chain grows in the narrow sense, the pseudo-0016]Therefore, since the monomer which can obtain a polymer with molecular weight distribution functional group, it is more desirable. Although living polymerization means the polymerization in narrow [a "living-radical-polymerization method"] and low viscosity, and also has a specific manufacturing method of the vinyl system polymer which has the above-mentioned specific functional group can be introduced into the almost arbitrary positions of a polymer, As a ratio of a monomer and an initiator.

living polymerization which grows while that by which the end was inactivated, and the activated thing

are generally in an equilibrium situation is also included. The definition in this invention is also the

aluminum alkoxides are added as an activator. The screw triphenyl phosphine complex of divalent iron polymerization" (Atom Transfer Radical Polymerization:ATRP) etc. which uses an organic halogenated cenzylic position), or a sulfonyl halida compound is used as an initiator. As a transition metal complex used as a catalyat of the above-mentioned atom transfer radical polymarization, the complex used as carbonyl compound which has halogen in an alpha position and the compound which has halogen in a polymerization reaction can be parformed in a non-solvent or various kinds of solvents. As a solvent, pages, Macro leakage-at-bulb KYURUZU (Macromolecules), 1994, The thing using radical scavengers flexibility of a design of an initiator or a catalyst being large, it is still more desirable. As this atom-transfer-radical-polymerization method, Matyjaszewski et al. [for example,], Journal OBU American (YURUZU (Macromolecules) 1995, 28 volumes, 7901 pages, science (Science) 1996, 272 volumes, 28 screw tributyl phosphine complex (NIBr, (PBu,),) of divalent nickel are also preferred as a catalyst. for example Hydrocarbon system solvent; diethylether, such as bonzene and toluene, Ether system a central metal can use the 7th fellows of the periodic table, eight fallows, nine fellows, ten fellows, and 11 group elements. As a deairable thing, the complex of zerovalent copper, univalent copper, a the first copper of bromination, a cuprous iodide, a cuprous cyanide, copper I oxida, the first copper nuthenium chloride is also preferred as a catalyst. When using a nuthonium compound as a catalyst, such as a nitroxide compound as shown in 27 volumes and 7228 pages, The "stom transfer radical (FeCl₂(PPh₃) 2). The screw triphenyl phosphine complex (NICl₂(PPh₃) 2) of divalent nickel and the solvents, such as a tetrahydrofuran; Halogenated hydrooarbon systam solvant; acetone, such as a groups in recent years. As the example, for example A journal OBU American chemical society (J. 0019]The organic halogenated compound which has an organic halogenated compound, especially eactant high carbon-halogen bond in this atom transfer radical polymenzation. (For example, the preferred. If a univalent copper compound is illustrated concretely, they will be a cuprous chloride, of perchlorio acid, etc. When using a copper compound, in order to improve catalytic activity 2,2"unctional group conversion reaction etc. at the end, and has a specific functional group from the 0017]As for the "iving-radical-polymerization method", research is positively made into various [0018]Alao in a "living-radical-polymerization method", an organic halogenatad compound or a sulfonyl halide compound An initiator, Tha "atom-transfer-radical-polymerization method" which manufacturing method of the vinyl system polymer which in addition to the feature of the above-18247 gazette or Sawamoto et al., and macro leakage-at-bulb KYURUZU (Macromolecules) 1995. Am.Chem.Soc.), 1994, 116 volumes, the thing using a cobalt porphyrin complex as shown in 7943 mentioned "living-radical-polymarization method" has halogen comparatively advantageous to a olumes, 1721 pages, etc. will be mentioned in 866 pages, WO 96/No. 30421 gazette, WO 97/No. divalent ruthenium, divalent iron, or divalent nickel is mentioned. Especially, a copper complex is polymerizes a vinyl aystem monomer by making a transition metal complex into a catalyst, As a particular and all the already illustrated things can be used conveniently. The above-mentioned 0020]As a monomer of a vinyl system used in this polymerization, there are no restrictions in derivative, tetramothylothylonediamine, pentamethyl diethylenetriamine, and hoxamethyl tris(2aminoethyl) amine, are added. The tristriphenyl phosphine complex (RuCl₂(PPh₃) ₃) of divalent bipyridyl and its derivative, Ligands, such as polyamine, such as a 1,10-phenanthroline and its chemical society (J. Am.Chem.Soc.) 1995, 117 volumes, 5614 pages, macro leakage-at-bulb compound etc. as an initiator and makes a transition metal complex a catalyst is raised.

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nethylene chloride and chloroform, Ketone solvent, auch as methyl ethyl ketone and methyl isobutyl

catone; Methanol, Ethanol, propanol, isopropanol, n-butyl alcohol, Alcoholic solvent, such as tert-butyl alcohol; oarbonate system solvanta, such as ester solvent; ethylena carbonata, such as nitrile system propylene carbonate, etc. are mentioned. These can be independent, or can mix two or more sorts, can be used. The above-mentioned polymerization can be performed in 0-200 **, and it is the solvant, ethyl scatate, such as acetonitrile, propionitrile, and benzonitrile, and butyl acetate, and ange of room temperature -150 ** prafarably.

place, crosslinkable silyl groups, (A) The hydrosilane compound which has crosslinkable silyl groups in 0021]Aithough the vinyl system polymer which has at least one crosslinkable silyl groups shown by he general formula 1 can be obtained using the method of illustrating below, it is not necessarily limited to these. As a synthesizing method of the vinyl system polymer which it has at least one polymerization which makes the compound which has in a monad a basis which can react to the vinyl system polymer which has at least one alkenyl group, By the method (C) radical

oolymer which has at least one method (B) hydroxyl group made to add under hydrosilylation catalyst Method; etc. to which the compound which has stable carbanion with orossinkable silyl groups in one nolecule in the vinyl system polymar which has at least one high carbon-halogan bond of method (E) solymerization nature in one molecule is made to react when compounding a vinyl system polymer. eactivity which uses the chein transfer agent which has crosslinkeble silyl groups is made to react existance. When compounding a vinyl system polymer by the method (D) radical polymerization to crossinkable silyl groups and a hydroxyl group like an isocyanate group react to the viryl system which the compound it has a compound, and the alkenyl group and crosslinkable silyl groups of

obtained by various methods. Although a synthesizing method is illustrated below, it is not necessarily .0022]The vinyl system polymer which has at least one alkenyl group used by the method of (A) is

nature and a low alkenyl group of polymerization nature in a monad which is mentioned, for example A-a) A method to which the compound it has a compound and an alkenyl group of polymerization limited to these.

to the following general formula (2) when compounding a vinyl system polymer by a radical polymerization is made to react as the 2nd monomer.

numbers 1–20, and may include one or more ether bonds.) R⁸ shows hydrogen or the alkyl group of the carbon numbers 1-10, the anyl group of the carbon numbers 6-10, or the arallyl group of the R3 shows hydrogen or a methyl group among a formula, R4 shows -C(O) O- or o-, m-, and pphenylene group, and R⁵ may show the divalent organic group of direct coupling or the carbon H,C=C(R3)-R4-R5-C(R8) =CH, (2)

alkenyl group of polymerization nature and a low alkenyl group of polymerization nature in a monad is made to react, it is especially living radical polymerization, When it expects rubber character, it is preferred to make it react as the 2nd monomer after the telophase of a polymerization reaction or Although there is no restriction at the stage to which the compound it has a compound and an carbon numbers 7-10.

which the compound which has at least two low alkenyl groups of polymerization nature, such as 1,5-[0023](A-b) When compounding a vinyl system polymer by living radical polymerization, A method to hexadiene, 1,7-octadien, and 1,9-decadiene, for example is made to react after the telophase of a A-c) How to make various kinds of organic metallic compounds which have an alkenyl group like colymerization reaction, or the ending reaction of a predetermined monomer. the ending reaction of a predetermined monomer.

polymer which has at least one reactant high carbon-halogen bond, and to replace halogen by it. [0024](A-d) How to make the stabilization carbanion which has an alkenyl group which is mentioned to a general formula (3) react to the vinyl system polymer which has at least one reactant high organic tin, such as ally! tributy! tin and ally! triocty! tin, for example react to the vinyl system carbon-halogen bond, and to replace halogen by it.

M*C - (R7) (R8)-R9-O(R8) =CH, (3)

groups which stabilize carbanion G \(^{\text{in}}\), or, in one side, another side ahows hydrogen, the alkyl group of the carbon numbers 1-10, or a phenyl group by said electron withdrawing group. R⁹ may show the nside of formula, and R⁹ -- the above -- the same -- both R⁷ and R⁸ are elactron withdrawing

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JP,11-100433,A [DETAILED DESCRIPTION]

As an electron withdrawing group of R⁷ and R⁸, especially the thing that has the structure of -CO₃R, divalent organic group of direct coupling or the carbon numbers 1-10, and may include ona or more ather bonds. M* shows alkali metal ion or the 4th class ammonium ion.

halogen or an acetyl group, a carbonyl compound which has an alkenyl group, an isocynnate compound which has an alkenyl group, an alkenyl group and better the compound which has an alkenyl group and add halbed which has a alkenyl group as shown, for [002016]A-4] have to make the yon almon or carboxylate anion which has an alkenyl group as shown, for 0025](A-e) To the viryl system polymer which hes at least one reactant high carbon-halogen bond. For example, make the metal simple substance or organic metallic compound like zinc act, and a ano rate anion is prepared. How to make after an appropriate time react to the electrophilicity compound which has alkenyl groups, such as an alkenyl group content compound which has a leaving group like example in the general formula (4) or (5) react to the vinyl system polymer which has at least one resotant high carbon-halogen band, and to replace halogen by it. -C(O) R. and -CN is preferred.

 $({\sf R}^6$ and ${\sf M}^4$ are the same as the above among a formula.) ${\sf R}^{10}$ may include one or more ether bonds H2C=C(R6)-R10-0 - M+ (4)

by the divalent organic group of the carbon numbers 1-20. H2C=C(R6)-R11-C(0) 0 - M+ (5)

132706,A in a radical polymerization, ethylene chloride, cerbon tetrabromide, and a methylene bromide least one alkenyl group is possible also for obtaining from the vinyl system polymer which has at least one hydroxyl group and can use the method of illustrating below, it is not necessarily limited to these. stom-transfer-radical-polymerization method; etc. which make a transition metal complex a catalyst are mentioned, it is not necessarily limited to these. Although the vinyl system polymer which has at (R⁸ and M⁺ are the same as the abova among a formula,) It is mentioned that R¹¹ may include one or more ether bonds by the divelent organic group of direct coupling or the carbon numbers 1-20 etc. [0027]The synthetic method of the vinyl system polymer which has et least one above-mentioned reactant high carbon-halogen bond as an example, (E-a) a carbon tetrachloride as shown in JP,4-0028](E-b) The above organic halogenated compounds etc. are used as an initiator, and although dow to make a base like sodium methoxide (A-g) act on the hydroxyl group of the vinyl system polymer which has at least one hydroxyl group, and make it react to an alkenyl group content - how (chain transfer agent method) to use a halogenide [like] for a chain transfer agent.

(A-j) Method, etc. which make alkenyl group content carboxylic acid, such as acrylic acid, react under (A-i) A method (meta) to which alkenyl group content acid halide like acrylic acidchloride is made to [0029](A-h) A method to which alkenyl group content isocyanate compounds, such as an react under base existence, such as pyridine. allylisooyanate, are mede to react halogenide like an allyl chloride.

radical-polymerization method. The method of of the point that control is easier to (A-b) is still more preferred. When introducing an alkenyl group by changing halogen of the vinyl system polymer which has at least one reactant high carbon-halogen bond. The organic halogenated compound which has at polymerization of the vinyl system monomer by making a transition metal complex into a catalyst invention (A-a) (A-b) directly, it is preferred to compound a vinyl system polymer using a livingwhich is obtained by using a sulfonyl halide compound as an initiator and carrying out the radical atom-transfer-radical-polymerization method) and which has at least one reactant high carbon-(0030)When halogen does not participate in the method of introducing an alkenyl group like this least one reactant high carbon-halogen bond. Or it is preferred to use the vinyl aystem polymer halogen bond at the end. The method of of the point that control is easier to (A-f) is still more existence of an acid catalyst are mentioned.

crosslinkable sityl groups, if a typical thing is shown, the compound shown by a general formula (6) will :0031]Although there is no restriction in particular as a hydrosilane compound which has

H-[Si(R1) 2-6(M) 60] m-Si(R2) 3-8 (Y) 8 (6)

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Also in these hydrosilsne compound, it is aspecially a general formula (7). .R. R. a, b, m, and Y are the same as the above among a formule.)

H-Si(R²)₂₋₃ (Y)₃ (7)

the compound which has a cross-linking group shown by (the inside of s formula, R², Y, and a are the 0032]When making the hydrosilane compound which has the above-mentioned crosslinkable silyl groups add to an alkenyl group, a transition metal catalyst is usually used. The thing which, for sams as the above) -- sequisition -- it is desirable from an easy point.

example, made carriers, such as a platinum simple substance, alumina, silica, and carbon black,

listribute a platinum solid as a transition metal catalyst, A complex with chloroplatinic acid,

chioroptatinio andi alcohol alabhola ketone aca. a patrium-rollin complex and a platimum (0)-deliniti tetrametril discorne complex en omationed Lea no acampe of catabless other than a platinum compound RhO(FPA), a RhO(3, RhO(3, FO(3, FO(3), RO(3, FO(3), RO(3, FO(3), RO(3), RO(3),

0033](B) And the manufacturing method of the vinyl system polymer which has at least one hydroxyl group used by the method of (A-g) - (A-j) is not limited to these methods, although the following

 when compounding a vinyl system polymer by a radical polymerization is made to react as the 2nd B-a) A mathod to which the compound it has a compound, and the alkanyl group and hydroxyl group of polymerization nature in a monad which is mentioned, for example to the following general formula

1,C=C(R3)-R4-R5-OH (8)

The inside of a formula, R3, R4, and R5 are the same as the above)

alkenyl group and hydroxyl group of polymerization nature in a monad is made to react, it is especially iving radical polymerization, and when it expects rubber character, it is preferred to make it react as Although there is no restriction at the stage to which the compound it has a compound, and the the 2nd monomer after the telophase of a polymenization reaction or the ending reaction of a

(0034)(B-b) A method to which 10-UNDESE Norian, 5-hexenol, and alkenyl alcohol like allyl alcohol predetermined monomer.

predetermined monomer for example when compounding a vinyl system polymer by living radical are made to react after the telophase of a polymerization reaction, or the ending reaction of a polymerization.

nonomer using hydrogan psroxide or a hydroxyl group content initiator as shown in JP,6-239912,A nonomer, using so much a hydroxyl group content chain transfer agent like the hydroxyl group (B-d) For exemple, the method of carrying out the radical polymerization of the vinyl system content polysulfide ahown in JP,5-262808,A.

(B-c) For example, the method of carrying out the radical polymerization of the vinyl system

(B-f) For example, the method of introducing a hydroxyl group into an end by making halogen of the and JP.8-283310.A. (B-e) For example, the method of osrrying out the radical polymerization of the vinyl systam monomer, using elcohols as shown in JP,6-116312,A superfluously.

vinyl system polymer which has a reactant high carbon-halogen bond in at least one piece react to (B-g) How to make the stabilization carbanion which has a hydroxyl group which is mentioned to a general formula (9) react to the vinyl system polymer which has at least one reactant high carbonhydrolysis or hydroxyl group-containing compound by a method as shown in JP,4-132706,A etc. halogen bond, and to replace halogen by it.

M*C - (R7) (R8)-R9-OH (9)

As an electron withdrawing group of R⁷ and R⁸, especially the thing that has the structure of -CO₂R. It is the same as the inside of a formula, and R7, R8, R9 and ******

0035](B-h) How to, make the metal simple substance or organic metallic compound like zino act on ha vinyl system polymer which has at least one reactant high cerbon-halogen bond for example, to prepare a eno rate anion, and to make aldehyde or ketone react to aftar an approprieta time. -C(O) R. and -CN is preferred.

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JP,11-100433,A [DETAILED DESCRIPTION]

example in the general formula (10) or (11) react to the vinyl system polymer which has at least one (B=i) How to make the oxy anion or carboxylate anion which has a hydroxyl group as shown, for reactant high carbon-halogen bond, and to replace helogen by it.

(The inside of a formula, R¹⁰, and M⁺ are the same as the abova) HO-R¹⁰-O - M⁺ (10)

(The inside of a formula, R¹¹, and M⁺ are the same as the above) HO-R11-C(0) O - M* (11)

compound or a sulfonyl halide compound as an initiator, and carrying out the radical polymerization of radical-polymerization method. The method of of the point that control is easier to (B-b) is still more preferred. When introducing a hydroxyl group by changing halogen of the vinyl system polymer which radical-polymerization method). It is preferred to use for an end the vinyl system polymer which has at least one reactant high carbon-halogan band. The method of of the point that control is easier to 0036]When halogen does not participate in the method of introducing a hydroxyl group like (B-a) -(B-e) in this invention directly, it is preferred to compound a vinyl system polymer using a livingthe vinyl system monomer by making a transition metal complex into a catalyst (atom-transferhas at least one reactant high carbon-halogen bond, . Obtain by using an organic halogenated ** is mentioned.

mentioned, and the catalyst of a urethane-ized reaction generally known as occasion demands osn ba 0037]As a compound which has in a moned a basis which can react to crosslinkeble sliyl groups and gamma-isocyanata propylmathyl dimethoxysilane, gamma-isocyanate propyl triethoxysilane, etc. ere a hydroxyl group like an isocyanate group, For example, gamms-isocysnata propyltrimethoxysilane, (B-i) is still more preferred.

following general formulas (12), such as trimethoxysilylpropyl (meta) acrylate and methyl dimethoxy [0038]As a compound it has a compound, and the alkenyl group and crosslinkable silyl groups of polymerization nature in the monad used by the method of (C). For example, what is shown with 42C=C(R3)-R4-R12- [Si(R1) 2-6(Y) 60] m-Si(R2) 3-4(Y) , (12) silyi propyl (meta) acrylate, is mentioned.

compound, and the alkenyl group and crosslinkable silyl groups of polymerization nature in a monad is made to react, it is living radical polymarization, When it expects rubber character, it is preferred to mentioned. What is shown by a general formula (13) as a compound having crosslinkable silyl groups Especially although there is no restriction in particular at the stage to which the compound it has a $(R^1, R^2, R^3, R^4, Y, a, b, and m are the same as the above among a formula.) <math>R^{12}$ may include one or crosslinkable silyl groups and crosslinkable silyl groups which are used by the chain transfer agant method of (D), and which are shown in JP,3-14068,B and JP,4-55444,B as a chain transfer agent meke it react as the 2nd monomer after the telophase of a polymerization reaction or the ending reaction of a predetermined monomer. Tha hydrosilene etc. which have the mercaptan which has more ether bonds by the divalent organic group of direct coupling or the carbon numbers 1-20. 0039]The vinyl system polymer which is used by the method of (E) and which has at least one reactant high carbon-halogen bond can be obtained by the method of (E-a) - (E-b) as abovewhich has crosslinkable silyl groups are mentioned.

As an electron withdrawing group of R7 and R8, especially the thing that has the structure of -CO,R. numbers 1-10 shows hydrogen or the alkyl group of the carbon numbers 1-10, the aryl group of the It is the same as R¹, R², R⁷, R⁸, Y, a, b, m, and ****** among a formula.) R¹⁴ in which R¹³ may include one or more ether bonds by the divalent organic group of direct coupling or the carbon $M^{+}C^{-}(R^{7})(R^{9})-R^{13}-C(H)(R^{14})-CH_{2}-[Si(R^{1})_{2-6}(Y)_{b}O]_{m}-Si(R^{2})_{3-a}(Y)_{a}(R^{2})_{3-b}(Y)_{a}(R^{2})_{3-b}(Y)_{a}(R^{2})_{3-b}(R$ carbon numbers 6-10, or the sralkyl group of the carbon numbers 7-10.

and stabilization carbanion is mentioned into a moned.

piece chain. In ordar to obtain an organic halogenated compound or a sulfonyl halide compound by the colymerizing method using an initiator and a transition metal complex as a catalyst, it is preferred to 0040]The vinyl system polymer which crosslinkable silyl groups has at the end of an at least one--C(O) R, and -CN is preferred.

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0/17 ペーツ

[DAA2](R expresses an alky) group of the carbon numbers 1–20, the carbon number 6 – 20 any groups or the carbon number 7 – 20 analog groups among a formula, O g.H, expresses a phenytene group, n expresses an integer of 0–20. X expresses otherine, bromine, or lodine.

[0043] [Formula 2]

one— X—80₂—Cg4i₄-80₂—X [0044]IX express chlorine, bromine, or iodire among a formula,) n expresses the integer

[DG4]X occurs activation behanics around a common and a consistent in integer of C-20. Qg¹, E-20. Qg¹, E-20. Qg¹, E-20. Qg¹, E-20. Qg¹, E-20. Qg¹, E-20. Qg², E-

the view greaten polymer which has recentificable and jurgue in one end call in which other order have the structure of the general formula 2 will be obtained. Thus, if inleger of the alone ord of the popular debtained is changed into a crosslaviable—sigh-groups content substitutent, the winyl system ownershall be used as the conversition for groups in both ends can be obtained. The alterest indicated method can be used as the conversition method.

(0046)Athough there is no restriction in particular as an organic halogenated compound which has consisting angular, what has the structure shown, for example in the general formula (14) and (15) is illustrated. (15) is illustrated -17_{-1} (1 $_{-2}$)(14) -17_{-1} (1 $_{-2}$)(14) -17_{-1} (1 $_{-2}$)(14) -17_{-1} (14)

(R.¹ K², L, m, X, and Y are the same as the above, or anotas a formula.)—Independently R¹⁸ and R¹⁸
Hydrogen or an alway group of the conform marker 1-60. An art gives of the excellent marker 6-20, are arrived group or the carbon marker 1-20, are thing matually connected in the other end, and R¹⁸ show -60,00 - -00,00 - or -m - and p-phenylens group. R¹⁸ in which R¹⁸ may hands one or more where boards by a challent regards of diend conform of the carbon marker 1-10 from the property of the carbon number 9-10,000 are marker 10.000 or or more hydrogen or an alway group of the carbon number 1-10, and yet group of the carbon number 9-10,000 or the marker 10.000 or

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(15) 3-2 (Y) SI-[OSKR¹) 2-6(Y) 1 -CH2-CH) (R¹⁹)-R¹⁸-C(R¹⁵) (X)-R¹⁷-R¹⁶ (15) an aralkyl group of the carbon numbers 7-10.

which has a total of two or more same or different functional groups, polyol, polyamine, polycarboxylic obtained also by carrying out coupling of the halogen ends using a compound which can replace language of this popular and which is a total of two or more such or different functional groups. [004]/Macuph there is no restriction in particular as a compound which can replace and halogen and compound which has an alkenyl group is used for an initiator, it will have an alkenyl group in one end, polymer obtained is changed into an alkenyl content substituent, if a vinyl system polymer which has silyl groups by an above-mentioned method etc., a vinyl system polymer which has crosslinkable silyl (The inside of a formula, R_1 , R_2^2 , R_1^{15} , R_1^{16} , R_1^{17} , R_1^{18} , R_1^{19} , R_2 , R_1 , R_2 , and Y are the same as the above) if an organic habogeneted compound which has crosslinkeble slly groups is used as an initiator, a acid, polythiol and those safts, an alkaline metal sulfide, etc. are preferred. If an organic halogenated an alkenyl group in both ends can be obtained and this alkenyl group is changed into crosslinkable and a polymer in which other ends are halogen will be obtained. Thus, if halogen of an end of a polymer whose one end is orosslinkable silv) groups and in which other ands are halogen will be obtained, but A viryl system polymer which has crosslinkable silyl groups in both ends can be groups in both ends can be obtained.

vhich has a hydroxyl group, halogen, or at least one alkenyl group, it is preferred that thesa functional constructing a bridga which has big influence on rubber elasticity can take greatly, as for at least one of crosslinkable silyl groups, it is praferred that it is in an end of a chain, and it is still more preferred used when compounding a vinyl system polymer which at least one crosslinkable silyl groups has and [0048]In this use as which rubbar character is required, since a molecular weight between the points that it is in molecular chain terminals altogether. Therefors, as for a vinyl system polymer which is groups are what exists in an end of a chain.

problem that molecular weight distribution of a polymer obtained is generally as large as two or more, nethod", such crosslinkable silyl groups exists in an end at a comparatively high rate, but there is a nethod of manufacturing an acrylic polymer especially (meta) are indicated by JP,3-14068,B, JP,4and viscosity becomes high. Therefore, it is preferred to use a living-radical-polymerization method for obtaining a vinyl system polymer with low viscosity with narrow molecular weight distribution 0049]Aithough a vinyl system polymer which has at least one crosslinkable silyl groups, and a 55444,B, JP,6-211922,A, ctc., for example, Since these methods use a "chain transfer agent

bisphenol A propylane oxide addition, Fire retardancy type epoxy resins, such as a hydrogenation bisphanol A type epoxy reain and glyckyl ether of tetrabromobisphanol A proxybenzoic acid glyckyl glycerin, a hydantoin type epoxy resin, and petroleum resin, etc. are illustrated, Not a thing limited to spoxy ream, a urethane modified spoxy resin, Various cycloaliphatic-apoxy-resin and N,N-dighyoidyl other ester typed epoxy resin, m-aminophenol type epoxy rasin, A diaminodiphenyimethane system aniline. N.N-digiyoidyl o-toluidine, Although an epoxidation thing of unsaturation polymers, such as triglycidyl isocyanurate, polyalkylene glycol diglycidyl ether, glycidyl ether of polyhydric alcohol like [0050] As an epoxy resin which is a (II) ingredient in this invention, A bisphonol A type epoxy resin, oisphenol F type epoxy rasin, Novolak typa epoxy resin, a glycidyl ether type epoxy resin of a these but an epoxy resin currently generally used may be used. which has crosslinkable sily! groups at the end at a high rate.

[0052]]If various hardening agents of an opoxy resin are used together, an effect may show up further, three-dimensional mesthes of a net. Bisphenol A type spoxy resins and novolek type epoxy resin are specifically more preferred, and bisphenol A type epoxy resins are still more preferred. These epoxy resins] high when hardening, and a hardened material is preferred from points — it is easy to make 0051]Reactivity is [what has an epoxy group in / at least one / a monad also in these epoxy resins can be independent, or can mix two or more sorts, and can be used.

tetraathylenapontamine, haxamethylonediamine. Diethylamino propylamine, N-aminoethyl piperazine, Lamy Ron O-260 by BASF A.G., Araldit HY-964 by CIBA, MENSENJI amine by loam and HASU, and concomitant use of various hardening agents is also included by this invention. If such a hardoning agent is illustrated, ethylenediamine, diethylenetriamine, Triethylenetetramine,

sophoronediamine, diaminohaxylmathane, m-xykenediamine, The 1st class amine, such as m-phenylenediamine, diaminodiphenylmethane, and diaminodiphenyl authone, (OH₂) Straight-chain-shape

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JP,11-100433,A [DETAILED DESCRIPTION]

dismine shown by $_2N(\text{CH}_2)_nN(\text{CH}_3)_2$ (the inside n of a formula is an integer of 1-10), (CH $_3$) Straight Tetramethyl guanidine, the 3rd class of alkyl monoamine shown by N(CH₂) _nOH₃) ₃ (the inside n of a tertiary amine, such as 2-(dimethyl aminomethyl) phenol and 2,4,6-tris(dimethyl aminomethyl) phenol serivative, various imidazole derivatives. Ketimine etc. which are obtained by a condensation reaction ydrolytic silyl group are mentioned into monads, such as N-(beta-aminocthyl)-gamma-aminopropyl ossable in both crosslinkable silvi groups shown in this hardenability resin composition by a general colymer which has at least one crosslinkeble sily! groups of a (I) ingradient, and an epoxy resin of a ingredient has the praferred range of 100 / 1 - 1/100 at a weight ratio, it is still more preferred formula is an integar of 1-10), Triethenolamine, piperidina, NN'-dimethylpiperazine, triethylamediamine, pyridine, pipoline, diazabicycloundecon, benzyldimethylamina, The 2nd class or preferred to use as elastic achasivaa used for adhesion of matarial in which coefficients of linear expansion differ, and adhesion of a member which receives displacement repeatedly by a thermo of a compound, an amine compound, and a carbonyl compound which have an amino group and a gamma-glycidoxypropytrimetoxysilana, etc. are mentioned, for axample. [0054]in a hardenability constituent of this invention, although the mixture ratio of a vinyl systom gamma-aminopropy) trimethoxysilane. N-(beta-aminoethyl)-gamma-aminopropy! triethoxysilane, chain tertiary amina ahown by $_2$ -N(CH $_2$) $_n$ -CH $_3$ (the inside n of a formula is an integer of 0-10). 0053]Since intensity will improve more if a compound which has a basis in which a reaction is Acid anhydrides, such as phthalic anhydride, trimellitic anhydride, pyromellitic dianhydride, and formula (1) and an epoxy group is added. It is desirable. As the example, N-(beta-aminoethyl)anhydrous benzophenone tetracarboxylic acid, Various polyamide resin, dicyandiamide and its that it is in the ranga of 100 / 5 - 5/100. As for this hardenability constituent, it is still more trimethoxysilane. JP.7-242737,A etc. are mentioned as an example of a ketimine compound.

preferred to carry out 0–10 weight-section use to vinyl system polymer 100 weight section which has antydride, hydrous sillicic acids, and reinforcing filler, calcium carbonate like carbon black, Fillers, such oatalyst, titanate; dibutyitin dilaurate, such as tetrabuthyl titanate and tetrapropyl titanate, Dibutyl tin Organic zirconium oompounds, such as zirconium tetra butoxide; Organic-lead-compounds L such as lauryl amine and tin octylate or a reactant of an amine compound and an organic tin compound like a mixture, and mixture; — low-molecular-weight-polyamide resin; obtained from superfluous polyamine fibroua filler like a filament can be used. To obtain a hardened meterial with high intensity with these diazabicyclo. (5, 4, 6) An amina compound of undecene 7 grade. Or thosa carboxylate; a reactant of 0055]Even if it uses a condensation catalyst in stiffening a vinyl system polymer which has at least (beta-aminoethyl) aminopropyl methyl dimethoxysilane, etc. if needed. As for the amount used, it is bentonite, ferric oxide, a zinc oxide, an sotive white, and a milt balloon; asbestos, glass fiber, and a at least one crosslinkable silyl groups. When an alkoxy group is used as the hydralytic basis Y, it is diacetyl acctonato, dibutyltin malcate, dibutyltin diacetate, Dibutyl tin dimethoxide, dibutyltin oxide, one crosslinkable silyl groups of this invention, it is not necessary to carry out. As a condensation Diphenylguanidine, 2,4,6-tris(dimethyl aminomethyl) phenol, Morpholine, N-methylmorpholine, 1, 3triethanolamine, diethylenetriamine, triethylenetetramine, oleylamine, ootylamine, cyclohexylamine, known a silane coupling agent which it has, for example, gamma-aminopropyl trimethoxysilane, N-(1056)A filler can be added in order to adjust the mechanical physical property of a hardenability as magnesium carbonate, diatomite, calcination clay, olay, tale, titanium oxide, bentonita, organio Organoaluminium compounds, such as aluminumtrisethylacetoacetate and disopropoxy aluminum and polybasic acid -- superfluous polyamine and a resultant; amino group of an epoxy compound constituent of this invention. Specifically Fumed silica, sedimentation nature silica, a silicic acid What is necessary is just to use one sort of silanol catalysts, or two sorts or more with publicly carboxylate, carboxylic acid, or a reactant of hydroxyl group-containing compound, Organic tin cthylacetoscetate, Zirconium tetra scetylacetonato zirconium TETORAISOPUROPOKISAIDO, lead ootykste, J., A butylamine, ootylamine, dibutyl amine, monoathanolamine, Diethanolamine, compounds, such as tin octylate and naphthenic acid tin; Aluminum tris acetylacetonato, benzylamine, diethylamine propylamine, xyllylene diamine, triethylenediamine, guanidine, preferred to use a curing catalyst only with this polymer, since the cure rate is slow.

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illers. Mainly Fumed silica, sedimantation nature silica, a silicio aold anhydride, hydrous silicio aoids,

nvention itself has an adheaive property to ceramics other than glass and glass, matal, etc., or, Since ime of polymer manufacture. An adhesion promoter with which a desirable result will be obtained if desirable result will be obtained if a filler mainly chosen from titanium oxide, calcium carbonate, tale, sorts can use it, mixing, it does not necessarily need. These plasticizors can also be blended at the reight soction to vinyl system polymer 100 weight section which has at Isast one crosslinkable silyl [067]A plasticizer can be added for adjustment of physical properties and viscosity. Specifically Distryl phralitate, disropyletritalista, elif-cythynoly physibate, Printalic series, cond as directed physical and burble-branyl physilates Diccryl sidpate, Norr-arcmatic distasis and extens, such as physical and except series and series and extens, such as electry statement, Destrylen sylvoli demonstr. Exer species of polylikylene piyool demonstry. Exer species of polylikylene piyools, such as ydrogenated terphenyl, etc. arc mentioned - these - independence -- or, although two or more ferric oxide, a zinc oxide, a milt balloon, etc. is added in the range of one to 200 weight section to phosphate; Poly ERIREN glycol, polyether; which changed polypropylene glycols or these hydroxyl belymer 100 weight section which has at least one crosslinkable silyl groupa. The polymer by this necessarily required, but it is preferred to use in order to acquirs a stable schesive property over salcium carbonate, calcination clay, clay, an active white, etc. is added in the rangs of one to 200 carbon black, A desirable result will be obtained if a filler chosen from surface treatment detailed rinyl system polymer 100 weight section which has at least one crosalinkable silyl groups. These TORIECHIRENGURIKORUJIBENZOETO, Trioresyl phosphate, Phosphoric ester, such as tributyl groups. When elongation wants to obtain a hardenad material which is size with low strength, A the amount of plasticizars is added in the range of zero to 100 weight section to vinyl system t is possible to make it paste up to a wide range material by using various primare, it is not groups --- chloroparaffin; -- hydrocarbon system oils, such as alkyl diphenyl and partiallyfillers may be used by one kind and may carry out two or more kind mixing use.

socyanate propyltrimethoxysilane which carries out a crosslinksble-silyl-groups owner to a sulfhydryl propylmethyl dimethoxysilane; A compound which carries out a crosslinkable-silyl-groups owner to an scryloxypropylmethyldimethoxysilane. These may be used alone or may be used together two or more compounds, such as paraformaldehyde, or novolac type phenol resin; sulfur, A bisphenol A type epoxy tycidoxypropyltrimetoxysilane, Compound;gamma-mercapto propyltrimethoxysilane which carries out group into monads, such as gamma-mercaptopropyl triethoxysilane and gamma-mercaptpropylmethyl kinds. A compound which carries out a crosslinkabla-ailyl-groups owner to an smino group especially resin, Bisphenol F type epoxy resin, novolak type epoxy resin, a glycidyl ether type epoxy resin of a bisphenol A propylene oxide addition, Epoxy resins, such as a hydrogenation bisphenol A type opoxy compound which carries out a crosslinkable-silyl-groups owner to an smino group into monads, such amino group into the above monads, and a compound which carries out a crosslinkable-silyl-groups compound which carries out a crosslinkable-sityl-groups owner to an acryloxy (mets) group, and a gamma-aminopropyl trimethoxysilane, N-(beta-aminoethyl)-gamma-aminopropyl triethoxysilane, A prosslinkable-silyl-groups owner to an isocyanate group into monads, such as gamma-isocyanate compound which carries out a crosslinkable-sit/d-groups owner to an amino group into the above shenol (for example, osshew oil densturation phenol.) tall oil densturation phenol etc. — etc. — a (0058)As an adhesion promoter, phenol, crosol, a xylenol, resorcinol, alkylphenol and denaturation phenol system compound and formslin. A resol type obtained by a reaction with aldehyde system aminopropyl tricthoxysilane, gamma-aminopropyl methyl dimethoxysilane, N-(beta-aminoethyl)acryloxyprophyltrimcthoxysilane, gamma-(meta) acryloxyprophyltriethoxysilane, Reactant [of a resin; Alkyl titanate, such as tetrabuthyl titanate. Aromatic polyisocyanate:gamms-sminopropyl crosslinkable-silyl-groups owner to an epoxy group into monads, such as gamma-glycidoxy propyltriethoxysilane and gamma-glycidoxy propyl methyldimethoxysilane, Compound:gammalimethoxysilane, gamma-isocyanate propyl triethoxysilane, A compound which carries out a trimethoxysilane, such as tolylene discosysnate and diphenylmethane discoyanate, gammaowner to an opoxy group into a monad. Or a reactant of a compound which cerries out a crosslinkable-silyl-groups owner to an isocyanate group into a monad: gamma-(meta) s N-(beta-aminoethyl)-gamma-aminopropyl methyl dimethoxysilsne: Gammamonads]: etc. are mentioned into monads, such as gamma-(mata)

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nto physical properties and a monsd in which adhesive control is comparatively easy, A compound

which carries out a crosslinksble-silyl-groups owner to an cpoxy group into a monad, a compound

preferred. A compound in which the above-mentioned nitrogen, oxygen, and an organic group that has an isooyanata group, or these react, and which has a nitrogen atom in a monad, and crosslinkable sibly goods from adheavive height is still more preferred. [0058]As for the above-mentioned adheasion promoter, it is preferred that 20 weight sections are which garries out a crosslinkable-silvi-groups owner to a suffrydryl group into a monad, A resotant of used from 0.01 to vinyl system polymer 100 weight section which has at least one crosslinkable silyl at least one of sulfur atoms have an organic group which is a basis generated when an amino group, compound which carries out a crosslinkable-silyt-groups owner to an amino group into a monad, is sulfur atoms, and crosslinkable silyl groupa in monads, such as a reactant etc. of a compound which a compound which carries out a crosslinkable-ailyI-groups owner to an aminc group into a monad, and a compound which carries out a crosslinkable-silyI-groups owner to an epoxy group into a monad, A compound which has an organic group which has at least ons of nitrogen, oxygen, and groups. In 0.01 weight sections, it is hard to reveal an adhosive improvement effect, and has an adverse effect on the physical properties of 20 weight-section ******* hardened material. An addition of an adhosion promoter is 0.5 to 5 weight section still more preferably 0.1 to 10 weight carries out a crosslinkable-silyl-groups owner to an acryloxy (meta) group into a monad, and a section preferably.

thickening under storage for a hardenability regulator again, a storage stability improving agent can be silane coupling agents, such as toluena and methyl ethyl ketone, Various denaturing agents, such as a 0060]In order to raise hardness when stiffening a hardenability constituent, or to lower hardness, to such as vinylmethyldimethoxysilane, and silicone varnishes; polysiloxanes are added if needed. Vinyl system polymer 100 weight section [for] which has at least one crosslinksble silyl groups, if it adds range of zero to 20 weight section, a desirable result will be obtained. [0082]in addition to this, a hardenability constituent of this invention Various solvent, several Kinds take out clongation and to control physical properties, a physical-properties regulator can be used. polymer 100 weight section [for] which has at least one crosslinkable silyl groups, if it adds in the glycidoxy propylmethyl JIISO propenoxysilane; Vinyttrimetoxysilane, Various silane coupling agents, propenoxysilane, Alkyl iao propenoxysilane, such as methyl TORIISO propenoxysilane and gammapolysiloxane which has crosslinkable silyl groups; A polyamide wax, Colorant, such as the surface As a physical-properties regulator, for example, methyl trinetoxysilans, dimethyldimethoxysilans, Alkyl alkoxysilans, such as trimethylmethoxysilane and n-propyltrimethoxysilans: Dimethyldi iso compound;2-ethylhexanoic acid which carries out a crosslinkable-silyl-groups owner, such as a tetraethoxysilane, methyl trimetoxysilane, and vinyltrimetoxysilane, is mentioned. Vinyl system 0061]In order to speed up or delay a cure rate of a hardenability constituent and to suppress characteristic of rheology oharacteristic regulator, ultraviolet curing nature resin, such as hydrogenation castor oil and mstallic soap, oxygen hardening resin, etc. and/or weatherproof orthoformate NADONO ortho ester, such as methanol and ethanol; carboxylic acid, such as added. As a hardenability regulator or a storage stability improving agent. Alcohols; methyl n the range of zero to 20 weight section, a desirable result will be obtained.

has at least one crosslinkable silyl groups, the curing catalyst and an epoxy resin, its hardening agent, multicomponent type mixed before use. A liquid which uses as the main ingredients a hardening agent absorbent, a SadamuMitsuyasu-ized agent, and a flameproofing agent, may also be used arbitrarily. A or a curing catalyst of a vinyl system polymer and an epoxy resin which furthermore has at least one hardenability constituent of this invention can also be prepared as one component type hardened by absorbing hygroscopic surface moisture in the after-construction air. A vinyl system polymer which system polymer which has an cpoxy resin and at least one crosslinkable silyl groups is blended with use. Handling is easy and one component type also with few mistaksa st the time of construction is more preferred. Although this invention is explained based on an example below, it is not limited to or a curing catalyst is blended with according to, respectively, and it is also possible to adjust as a according to, respectively, and it is also possible to prepare as two component types mixed bafore improving agent, paints, and a color, additive agents, such as an antiaging agent, an ultraviolet ray crosslinkable sily! groups, B liquid which uses as the main ingredients a curing catalyst of a vinyl carrying out combination seal preservation of all the combination ingredients beforehand, and

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(Synthetic example 1)

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An experience and programme an

The polymer 15g which has an alkayon set 12g year of being displayed by the polymer 15g which has an alkayon group at the end obtained above to a poly (sezylle acid Tauth Tauth Synthesiz 202m; Leistitis greater oil simple has considerable ably gauges at the end Tauth marityl disrestlycaylisms; Isal. (145 med) methyl orthodomate 0.28m; (24 med) and palatium bis marityl disrestlycaylisms; Isal. (145 med) methyl orthodomate 0.28m; (24 med) and palatium bis with the considerable ably gauges at the end was obtained viscosity of an obtained polymer was 4 with bus considerable ably groups at the end was obtained viscosity of an obtained bottomer was 4 can connect a serges medicular which the weight 190 medicular land 190 medicular and polymer and quell connected for the obtained by the orthodomate of a conser-indicing allocate part one molecular which the number of a conser-indicing apong per one molecular which the maryor.

from the form of complete the control of the contro

Frample 1 of comparison composition)

To popular 100 weight earther which has croudificable, all proups at the ned obtained in the company of the the control of the

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JP,11-100433,A [DETAILED DESCRIPTION]

(Example 2 of comparison composition)

In the heasequencedals in add rincy-thron enabled CD4. By It is bettion of 20 or of direcybrin on globel and and a good and a set of direcybrin on the control or set of the set of the control of the control or or of the control or of the control

(20-cons) of section methods to 170 g of hydroxy (map of 5.8 g (3.2mmod) rentalled obstain (20-cons) of sedium methods to 170 g of hydroxy (map ond polynoxy)ens oxide obstained by the method of sedium methods to 170 g of hydroxy (map ond polynoxy)ens oxide obstained by the methods of the 10-construction of the 10-con

able IJ		財振室1	比较第二	比較例2
用いた重合体		合成例1	比較合成例1	比較合成例2
E合体:エピコート828	<u></u>	分離濁りなし	分離通りなし	分離濁りなし
(衛衛比)	11	分類通りなり	分離漏りなし	な業施りあり

(0004)9y 13 of what is disclored, it has espectated into two planes and Estated is and or convention to another the convention I and the support of 1 in the the compatibility of a vinit system polymer and no reconvention is also fifted as polymer and no report or each in the compatibility of a vinit system polymer and no report or each new teach or plane and an other years in polymer and an other years in each other age as years or each new and an other and a polymer and an other years in each other age as a vinit system objects (100 veight section obtained in the synthetic

remained. By objective descripts, The exponent part of singles continues the contest (1881 and 1884 excellent man extended to make the section.)

The amount part of N-theches minocelety-perman-amounts opticity temporary capture dathers and water? Weight excellent methods and related the section of the sec

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(Comparative examples 3 and 4) The polymer obtained in the examples 1 and 2 of comparison or expension in the symbolic example 1 was used, and also physical proposability in the symbolic example 1 was used, and also physical proposition interests of the polymer obtained in the symbolic example 1 was shown in Table 2. The result was doublied and it was shown in Table 2. This bit 2.

用いた集合体 合成例1 は数合成例1 比較合成例2 M3G(MPa) 4.9 1.5 0.4 セん断弦さ(MPa) 6.5 4.6 6.6	7	聚拖倒2	北教御3	比較例4	
4.9 1,5 0 6.5 4.6	用いた整合体	合成例1	比較合成例1	比較合成例2	
9 6.5 4	M30(MPa)	6.4	1.5	9. 4	
	せん断弦さ(MP=)	6.5	4.6	6.6	

(1066)The abser strongly of Example 2 is also high at a high modulu. The combinations mixture of the comparative compile 3 in proportionally and it is harder to also with it is that the third of Example 2. The included materials were phylaxical proporties with them, I a modulu, in the run the third of Example 2. The included materials were polyteis proporties with them, I a modulu, in the run short a respect, to the complete and a modulus of the comparative comparative comparative comparative comparative proporties with the deformation in polyteic become large too much, and it is unutable. If of the comparative compared in the comparative compara

Example 3) Epocas (25 or Vivy) system organics (25 organics) in the synthatic carena, 1 (100 weight sections, The smooth part of billiand condensation catalysts (9516 grounds make from Saleyo organics), duplors, and 26 4-brid (denselved mornism thy) planed for meight sections, the same tops of 4 for the minimosity of 4 brid organics analysis or well the section when the same top or 4 for the minimosity organics and sections when the same of 4 for 4 summan spoorines of 4 for 100 Pc and 4 with the south or 100 Pc and 4 for 100 Pc and 4 for 100 Pc and 2 for 100 Pc and 2 was recoperated at a semination was done based on 105 (485). The result (was alrown if 1 label 6.)

examination was done based on US (8885). The result was shown in Table 3.
(Comparative example 5 and 8). The ophica obtained in the examples in and 2 of comparison composition instead of the polymer obtained in the surfaction example I was used, and also physical composition instead of the polymer obtained in the surfaction example I was used, and also physical properties were measured like Example 3. The result was doubled and it was shown in Table 3.

roperties were n 0067] Table 3]

業施例3 比較例6 比較例6 比較例6 用L小工配合件 台原例1 比較合成例1 比較合成例2 EA服装在(MPa) 8.0 5.0 8.9

[006]The combination mixture of the comparative example 5 is hyperviscosity, and it is harder to design with it than the fund of Example 3 and the comparative example 6 has distributed intensity. However, since the comparative example 6 is a presuntation which is not discolorated to the comparative example 6 is a presuntation which is not discolorated by many comparative example 6 is a presuntative or without 5 allowed, it is untuitied from the donline of physical properties. The intensity of the comparative example 5 is instificient.

Translation done.]